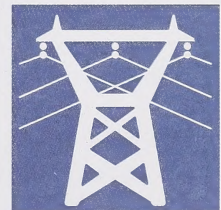
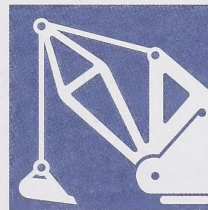
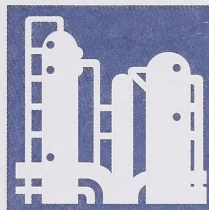


AL. 1. 734  
C-2



# Alberta's Energy Resources

## 1997 in Review



We welcome your feedback on this new publication. Please contact:

Mika Madunicky, Greg Gilbertson  
Communications  
640 - 5 Avenue SW  
Calgary, Alberta  
T2P 3G4

Telephone: (403) 297-8172 or (403) 297-3648

Fax: (403) 297-3757

E-mail: [madunmi@mail.eub.gov.ab.ca](mailto:madunmi@mail.eub.gov.ab.ca)

[gilbeg@mail.eub.gov.ab.ca](mailto:gilbeg@mail.eub.gov.ab.ca)

**Statistical Series 98-40**

**Alberta's Energy Resources**

**1997 in Review**

ISSN 1205-8734

Printed and published by the Alberta Energy and Utilities Board (EUB).

Readers are free to quote from, reproduce or use any part of this publication;  
EUB permission is not required.

Additional copies are available free of charge from:

Information Services  
Alberta Energy and Utilities Board  
640 - 5 Avenue S.W.  
Calgary, Alberta  
T2P 3G4  
Telephone: (403) 297-8190  
Fax: (403) 297-7040

**<http://www.eub.gov.ab.ca>**

# Contents

Alberta Hydrocarbon Production—An Overview .....	2
Oil, Gas, and Oil Sands Drilling Activity .....	4
Oil and Oil Sands: Production, Reserves, Markets .....	5
Natural Gas and Sulphur: Production, Reserves, Markets .....	8
Pipelines .....	11
Coal .....	11
Electricity .....	12
Alberta in the Canadian Energy Picture .....	13

## Conversion Factors Metric/Imperial Energy Equivalents

All most all values used in *Alberta Energy Resources 1997 in Review* are metric. For Imperial units, use the conversions below:

<b>Oil</b>	1 cubic metre	= 6.293 barrels
<b>Natural Gas</b>	1 cubic metre	= 35.5 cubic feet
<b>Coal</b>	1 tonne	= 0.98 long ton (2240.6 lb or 1000 kg) = 1.1 short ton
<b>Energy</b>	1 petajoule Light Oil	= energy equivalent of 163 500 barrels
	1 petajoule Heavy Oil	= energy equivalent of 152 000 barrels
	1 petajoule Bitumen	= energy equivalent of 147 000 barrels
	1 petajoule Synthetic Crude Oil	= energy equivalent of 159 700 barrels
	1 petajoule Pentanes Plus	= energy equivalent of 190 100 barrels
	1 petajoule Ethane	= energy equivalent of 342 100 barrels
	1 petajoule Propane	= energy equivalent of 248 000 barrels
	1 petajoule Butane	= energy equivalent of 223 300 barrels
	1 petajoule Natural Gas	= energy equivalent of 904 600 000 cubic feet

# Alberta's Energy Resources - 1997 in Review

This publication provides industry, media, government, the educational community, and the general public with an independent review of Alberta's energy resource activity in 1997. It includes charts, graphs, and maps showing year-end production, reserves, drilling activity, markets, and sales for Alberta's energy resources. It also documents production levels and markets for electric energy.

In 1997, Alberta's energy resources sectors enjoyed a strong performance for the second consecutive year. Total hydrocarbon sales rose 2 per cent to \$26.79 billion, up from the strong 1996 showing of \$26.27 billion, the result of consistent oil and gas prices. Led by an upturn in oil sands and conventional oil development drilling, the total number of wells drilled in Alberta in 1997 reached a record 13 212. This is a 2816 well increase over the 10 396 wells drilled in 1996 which was also a record year. Oil sands drilling increased by 25.6% in 1997 to 2700 wells, 551 wells greater than in 1996. Oil sands drilling has now set records three years in a row.

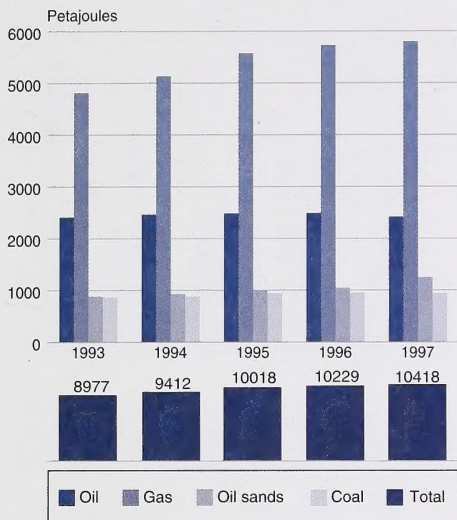
## Alberta Hydrocarbon Production—An Overview

### ALBERTA'S ENERGY RESOURCES — SUMMARY OF 1997 SALES

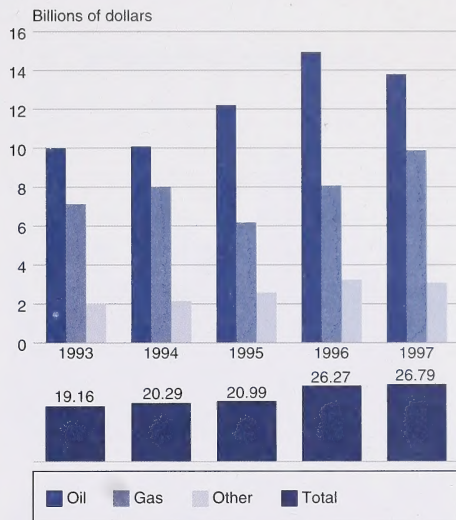
		To Alberta	To Other Provinces	Exports	Total
<b>1997 Sales</b>	Conventional Oil and Equivalent	938	576	2137	3651
(Petajoules)	Natural Gas and Natural Gas Liquids	1058	1618	2862	5538
	Coal (Marketable)	500	20	271	791
	Hydro	6	0	0	6
	Total	2502	2214	5270	9986
	Per Cent of Sales	25	22	53	100



### ALBERTA HYDROCARBON ENERGY PRODUCTION



### GROSS REVENUE—ALL HYDROCARBONS



#### Total hydrocarbon production up slightly in 1997

Sustained activity levels in Alberta's energy resource sectors lifted total hydrocarbon production 1.9 per cent higher in 1997 over 1996. Once again, bitumen and synthetic crude oil led with a 19.5 per cent increase in production, followed by a 1.2 per cent increase for gas and natural gas liquids. Coal production was down a percentage point, while conventional oil and equivalent production were down 3 per cent.

#### Alberta a net energy exporter

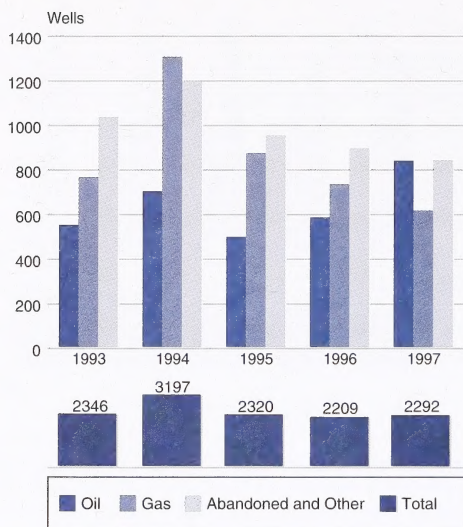
In 1997, exports accounted for over half of all of Alberta's energy sales, with 58.5 per cent of crude oil and equivalent and 54 per cent of natural gas exported. In all, 74 per cent of crude oil and equivalent and 83 per cent of natural gas sales went to other provinces and export markets. By contrast, 72 per cent of Alberta's marketable coal and all produced hydropower remained in the province to generate electricity.

#### Energy revenues continue slight upward trend

Fuelled by reasonably steady petroleum prices, sales of Alberta hydrocarbons and sulphur reached \$26.79 billion in 1997, a 2 per cent increase over 1996. Gas revenues led the way, jumping from \$8.1 billion in 1996 to \$9.9 billion in 1997, a rise of 22 per cent. Oil revenues slipped from the previous year, decreasing from \$14.95 billion in 1996 to \$13.8 billion in 1997. Revenues from natural gas liquids fell back 5 per cent, after increasing by more than 35 per cent in 1996. In 1997, oil production accounted for 51.5 per cent of all energy sales, natural gas 36.9 per cent, and natural gas liquids, coal, and sulphur 11.5 per cent.

## Oil, Gas, and Oil Sands Drilling Activity

### OIL AND GAS WELLS—EXPLORATION

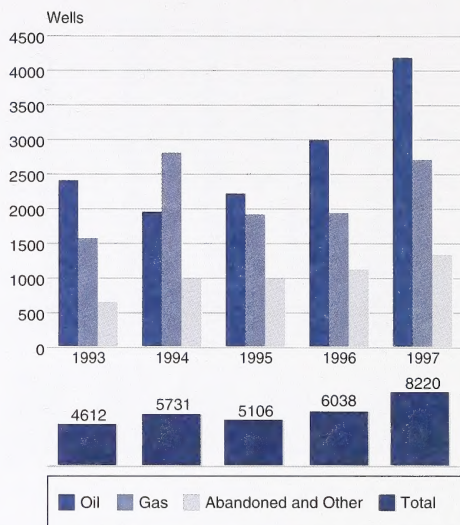


### Drilling record set for second year

Led by an upturn in oil sands and conventional oil development drilling, the total number of wells drilled in Alberta in 1997 reached a record 13 212. This is a 2816 well increase over the 10 396 wells drilled in 1996 and a second consecutive record year. More than 188 000 wells of all types have now been drilled in Alberta since well records began in 1902.

Oil sands drilling increased by 25.6% in 1997 to 2700 wells, 551 wells greater than in 1996. Oil sands drilling has now set records three years in a row. The reasons for this steady rise in drilling include increases in oil prices, lower costs of oil sands production, and the gradual decline in opportunities to discover light and medium crude oil. The oil sands drilling total comprised 2058 bitumen primary and commercial wells and 642 evaluation and experimental wells.

### OIL AND GAS WELLS—DEVELOPMENT



Development drilling in existing oil and gas fields also made significant gains, rising by 36 per cent to 8220 wells. Oil development drilling led the way, increasing from 2987 wells in 1996 to 4181 in 1997, while gas development drilling was also up, to 2704 wells in 1997 from 1932 wells in 1996.

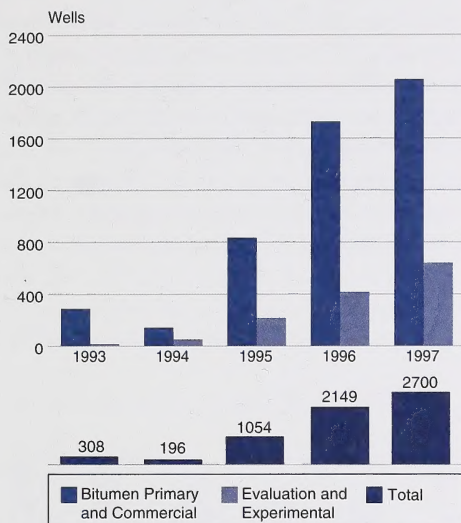
Conventional oil and gas exploration drilling rose by 3.8 per cent to 2292 wells in 1997, following a 4.8 per cent decline the previous year. A decrease in gas exploration was offset by an increase in oil exploration.

### Well licences increase yet again

The EUB issued 15 369 well licences in 1997, up 28 per cent from 11 935 in 1996, which in turn had seen a 26 per cent increase over the 9449 well licences issued in 1995. About 85 per cent of licensed wells are drilled each year, thus the discrepancy between the number of licences and actual drilling activity. Licenced wells also include other drilling activity such as abandonment, disposal and injection wells.



## OIL SANDS DRILLING



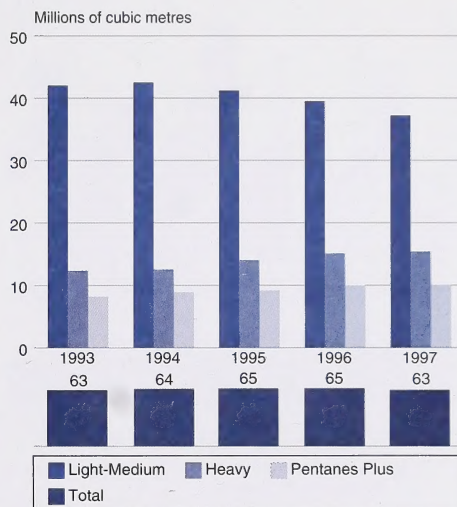
### Active and capable wells

There were 51 241 capable oil, heavy oil, synthetic crude oil and crude bitumen wells in 1997, compared with 47 351 in 1996. The number of capable gas wells also rose, to 51 212 in 1997 from 47 530 the previous year.

Active wells are those showing production in a given month, but not all wells produce all the time. The average number of wells operating each month in 1997 totalled 33 143 oil and 39 687 gas wells. At the end of 1997, there were 7541 capped gas wells, down 609 from 1996.

## Oil and Oil Sands: Production, Reserves, Markets

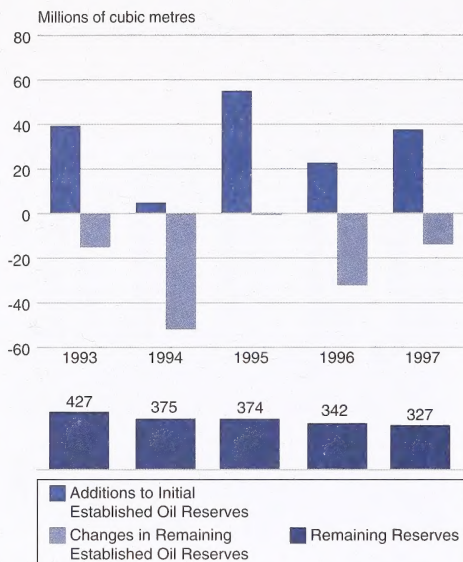
### OIL AND PENTANES PLUS PRODUCTION



### Conventional oil production down slightly

Alberta's production of conventional crude oil and pentanes plus—a light crude oil equivalent produced in association with natural gas—totalled 63 million cubic metres in 1997, down 1.9 million cubic metres from the previous year. Production of light-medium oil fell by 6.2 per cent, while heavy oil and pentanes gained by 2 and 1 per cent respectively.

### CHANGES IN RESERVES



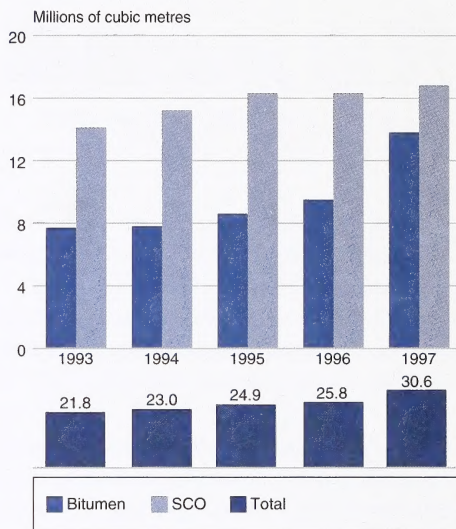
### Conventional oil reserves continue to fall

In 1997, due to new discoveries, development of existing pools, and enhanced recoveries, industry activity added 28.8 million cubic metres to initial established reserves of conventional crude oil. The net reassessment of existing reserves totalled positive 8.7 million cubic metres bringing the total increase in Alberta's initial established reserves to 37.5 million cubic metres.

But, with production outstripping these additions, Alberta's remaining established reserves of conventional crude oil dipped by 4.3 per cent to 326.8 million cubic metres by year's end. Reasons for the decline included reduced well spacing and the use of new technologies such as horizontal drilling, which allowed reservoirs to be more rapidly depleted.

Overall, conventional oil production has continued to outpace additions to reserves since production peaked in 1973. Nonetheless, exploratory and development drilling along with enhanced recovery methods still add to these reserves, thus extending the remaining years of conventional oil production. At the same time, synthetic crude oil production from oil sands continues to expand, filling the gap left by declining conventional oil reserves.

### BITUMEN AND SYNTHETIC CRUDE OIL (SCO) PRODUCTION



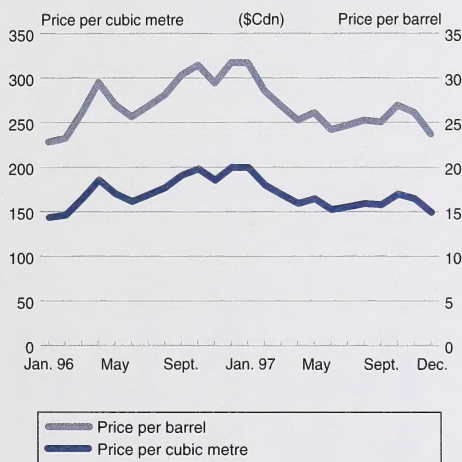
### Another record year for oil sands

Once again, bitumen and synthetic crude oil production reached record levels in 1997. Production was up 18.6 per cent to 30.6 million cubic metres, continuing a steady upward trend of oil sand expansion. Both bitumen and synthetic crude oil production rose, with bitumen rising 45.3 per cent, while synthetic production increased 3.1 per cent. Oil from oil sands now accounts for nearly 34 per cent of Alberta's total oil production.



In 1997, initial established reserves of crude bitumen from deposits under active development decreased slightly to 1021 million cubic metres from the 1035 million cubic metres recorded in 1996. Of that 1997 total, 644 million cubic metres were from surface-mineable projects and 377 million cubic metres from in situ schemes. At year end, the remaining established reserves of crude bitumen from deposits under active development were 340 million cubic metres for mineable and 274 million cubic metres for in situ projects.

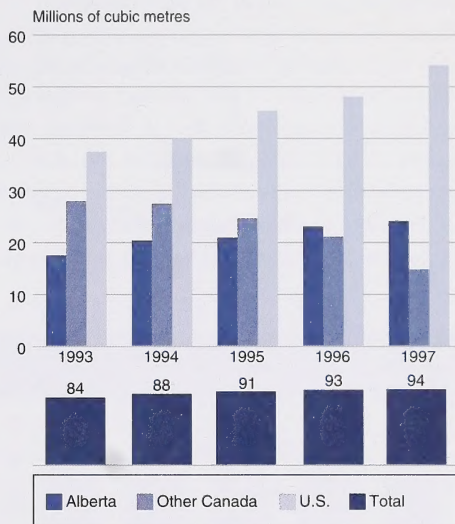
#### ALBERTA AVERAGE WEIGHTED FIELD PRICE FOR LIGHT OIL



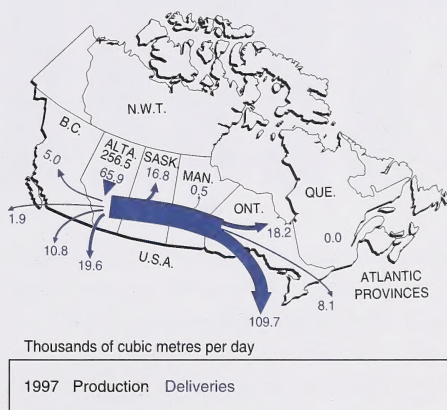
#### Average oil price declines

The 1997 weighted Alberta field price for light and medium oil averaged \$164.73 per cubic metre in Canadian dollars (\$26.19 per barrel). This is a 5.3 per cent decrease over the 1996 average price of \$174.00 per cubic metre. However, this price helped Alberta's overall hydrocarbon gross revenues to remain over \$26 billion for each of the past two years.

#### MARKETS FOR OIL



#### DELIVERIES OF OIL



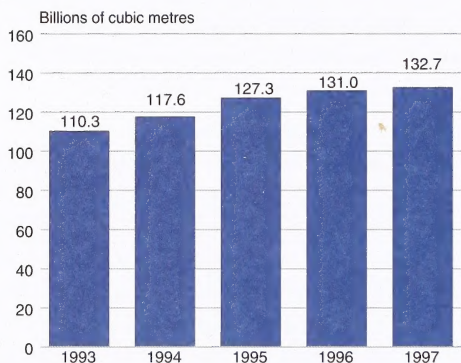
#### Oil deliveries rise slightly

Total deliveries of Alberta oil, including synthetic crude from oil sands production, grew by 0.9 per cent to 93.6 million cubic metres in 1997. The increase was led by a rise in deliveries of 4.7 per cent within Alberta and 12.5 per cent to the United

States. Declines were recorded in the rest of Canada, where deliveries fell by 29.8 per cent. While offshore deliveries fell by 4.1 per cent in 1997, they still accounted for less than one per cent of markets. By contrast, just over half of Alberta's total oil production went to the U.S. Midwest. One quarter stayed in Alberta for refining into other energy products, some of which were then exported. Of the other Canadian markets, Ontario and Saskatchewan accounted for the bulk of deliveries.

### Natural Gas and Sulphur: Production, Reserves, Markets

#### GAS PRODUCTION



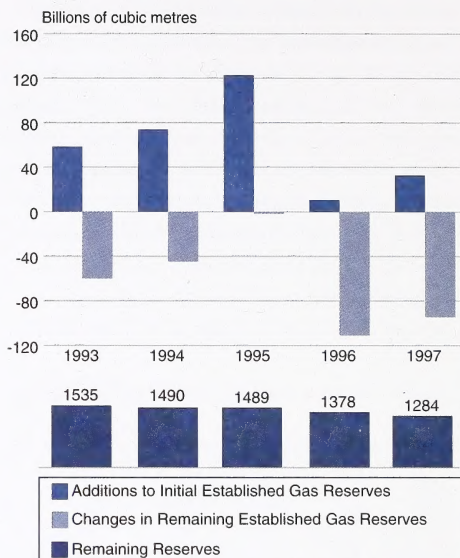
#### Natural gas production up slightly, sets record

Production of marketable natural gas rose 1.3 per cent to 132.7 billion cubic metres in 1997, breaking the 1996 record of 131 billion cubic metres. While still rising in overall volumes, gas production increases have slowed in percentage terms. Growth was 6.6 per cent in 1994; 8.2 per cent in 1995; and 2.9 per cent in 1996.

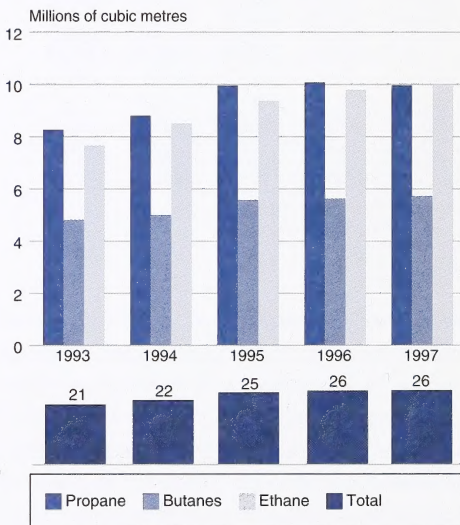
#### Gas reserves decline

Some 33.1 billion cubic metres of natural gas were added to Alberta's initial established reserves in 1997. But those additions were outstripped by production, resulting in an overall decrease of

#### GAS RESERVES



#### NATURAL GAS LIQUIDS PRODUCTION

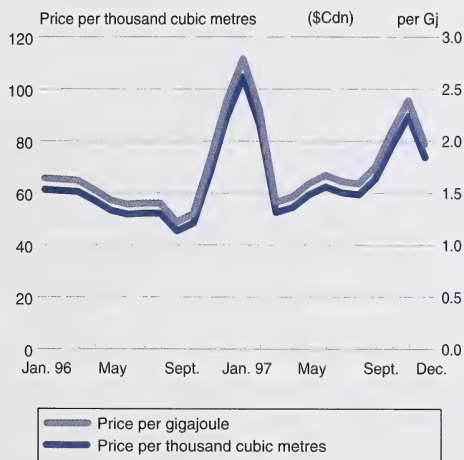


94.2 billion cubic metres, continuing a four year reduction in established gas reserves. At the end of 1997, Alberta's remaining established reserves of natural gas stood at 1284 billion cubic metres.

## Natural gas liquids production increases

The production of Alberta's natural gas liquids rose marginally by 0.7 per cent to 25.7 million cubic metres in 1997, down from the 2.4 per cent growth of 1996, and showing a continuing slow down from the 9 per cent average growth rate posted over the three years prior to 1996. Ethane production grew the most, increasing from 9.81 million cubic metres in 1996 to 9.99 million in 1997, while butanes posted a smaller gain from 5.63 million cubic metres to 5.73 million. Propane fell from 10.08 million cubic metres in 1996 to 9.97 million in 1997. These natural gas liquids are used in petrochemicals, refining, and as energy sources. The production of another natural gas byproduct, pentanes plus, are included in crude oil production statistics (see page 5).

### ALBERTA AVERAGE MARKET PRICE FOR GAS

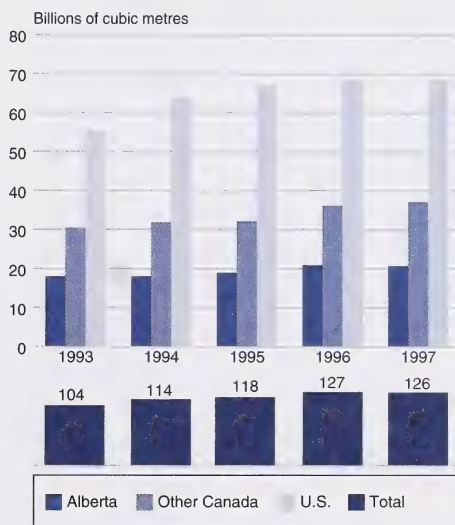


## Average natural price continues to rebound in 1997

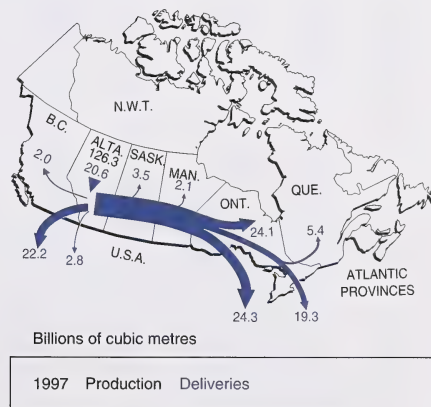
In 1997, the average market price for Alberta natural gas gained further ground from 1996 prices, increasing to \$70.50 per thousand cubic metres in Canadian dollars (\$1.87 per gigajoule). That marked a 20.9 per cent rise over 1996, when

the price recovered by 24.6 per cent to \$58.30 from 1995's average of \$46.78. This strong performance was reflected in the improved gross revenue picture for Alberta hydrocarbons (see page 3).

### MARKETS FOR GAS



### DELIVERIES OF NATURAL GAS





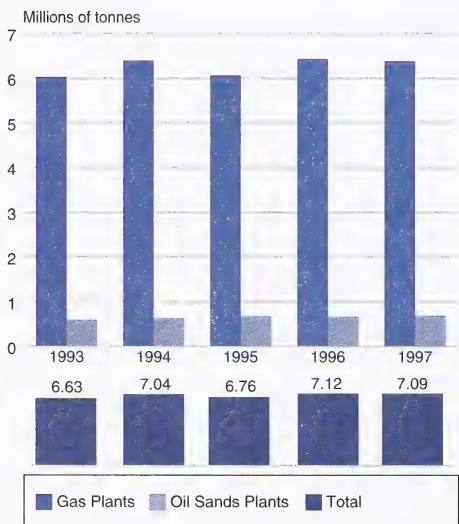
### Gas markets show small decline

Alberta natural gas sales declined by 0.7 per cent in 1997 to 126.3 billion cubic metres. The bulk of that decline occurred in Alberta, where sales fell by 7 per cent, while increasing 2.5 per cent in the rest of Canada. The U.S. also saw a slight decline of 0.4 per cent, however that market still accounted for 54 per cent of Alberta's total natural gas sales. Just over 29 per cent of sales went to the rest of Canada, principally Ontario, for heating and petrochemical production, while just over 17 per cent stayed in Alberta for heating, petrochemical feedstock, and electricity production.

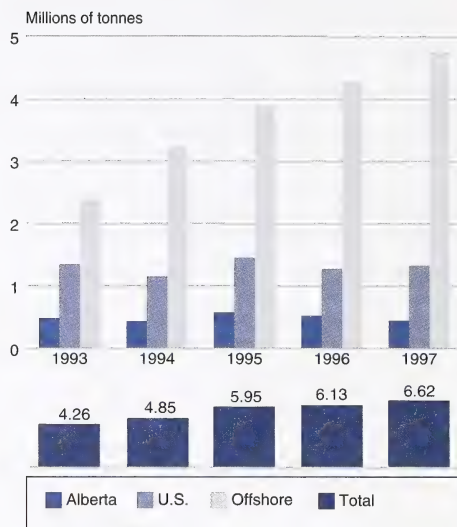
### Sulphur markets hold their strength

Alberta produced 7.09 million tonnes of sulphur in 1997, a 0.3 per cent decrease over the 1996 figure of 7.12 million tonnes, which was the highest total ever, slightly surpassing the previous record of 7.1 million tonnes set in 1973. Gas processing plants continued to produce the vast bulk of sulphur—6.38 million tonnes—distantly followed by oil sands plants and oil refineries.

**SULPHUR PRODUCTION**



**MARKETS FOR SULPHUR**

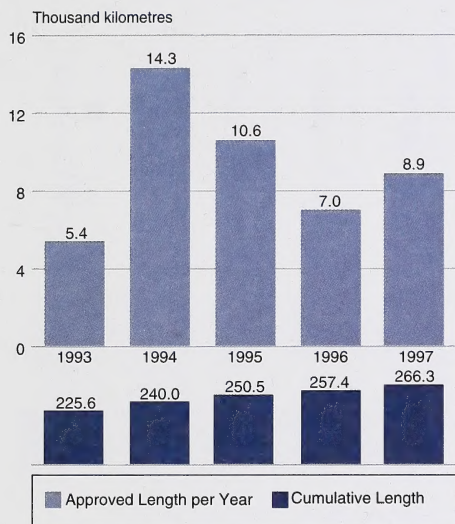


### Sulphur markets continue to strengthen

In 1997, sulphur producers found markets for 6.62 million tonnes, or 93 per cent of the total produced. That represented an 8 per cent increase in sales over 1996. Offshore customers in countries like Morocco, Brazil, South Africa, and Indonesia led the way with an 11.4 per cent increase in purchases. United States purchases increased 4.4 per cent, while sales declined 15 per cent in Alberta. Offshore markets accounted for more than 72 per cent of sales and U.S. markets for 20 per cent. Alberta producers rely heavily on export markets to absorb their large quantities of sulphur, which is removed from natural gas containing hydrogen sulphide.

## Pipelines

### PIPELINE INSTALLED



### Pipeline construction increases

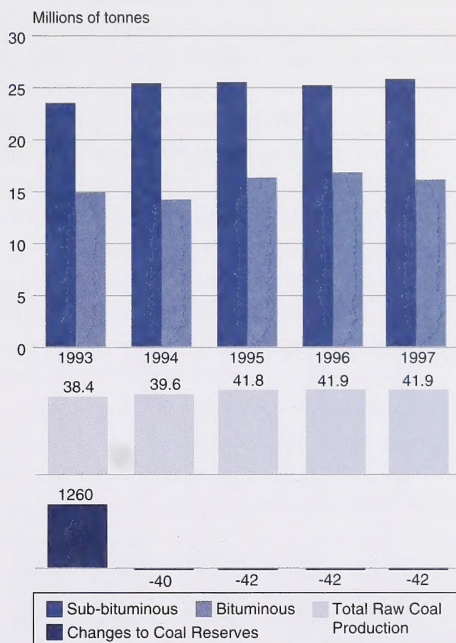
In 1997, the EUB approved construction permits for 8850 kilometres of intra-Alberta pipelines, up 25.5 per cent from the previous year's total of 7050 kilometres. These additions brought the total length of intra-Alberta pipelines to approximately 266 297 kilometres. The Alberta portion of inter-provincial pipelines are regulated by the National Energy Board and are not included in these statistics.

## Coal

### Coal production and reserves remain static

Alberta's raw coal production of 41.9 million tonnes for 1997 kept pace with the 41.9 million tonnes produced in 1996, however, this interrupts a trend in recent years of slow but steady expansion. Sixty per cent of the produced total, 25.8 million tonnes, was sub-bituminous coal, destined for Alberta's coal-fired power plants. The remaining

## COAL PRODUCTION AND RESERVES



16.1 million tonnes was bituminous coal for export markets.

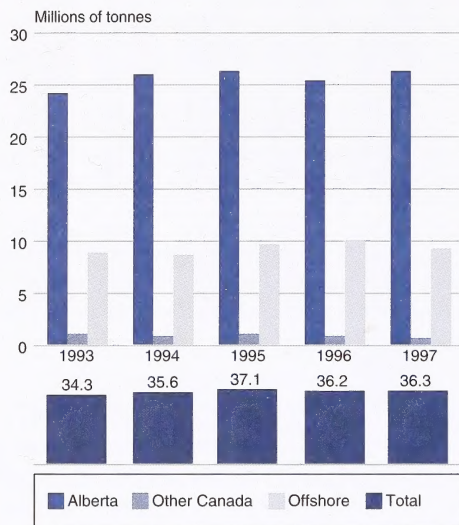
In 1997 Alberta's coal reserves continue decline by 42 million tonnes. At year's end, total coal reserves stood at 35 billion tonnes. There is long-term potential to expand those reserves however, since much of the province is underlain by coal deposits.

### Coal deliveries up slightly

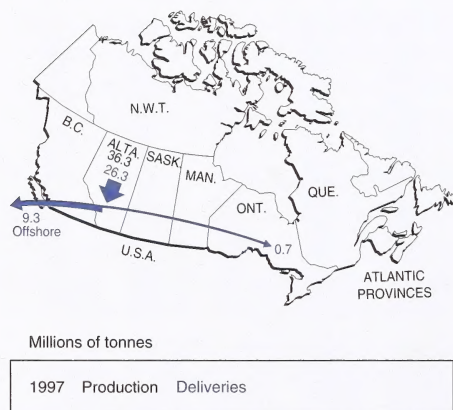
Total deliveries of marketable coal rose by 0.3 per cent in 1997 to 36.3 million tonnes. Markets for coal were mixed, led by a decline of 22.2 per cent in the rest of Canada, but an increase in coal deliveries of 4.4 per cent in Alberta. Coal deliveries increased 5.6 per cent in export markets other than Japan, including such countries as Korea, Brazil, and the United Kingdom. Japan, which increased its imports of Alberta thermal coal by 10 per cent to 6.5 million tonnes in 1996,

- decreased by 15.4 per cent to 5.5 million tonnes in 1997. Power-generating plants within Alberta consumed 26.2 million tonnes of mostly sub-bituminous grade coal in 1997.

### MARKETS FOR COAL

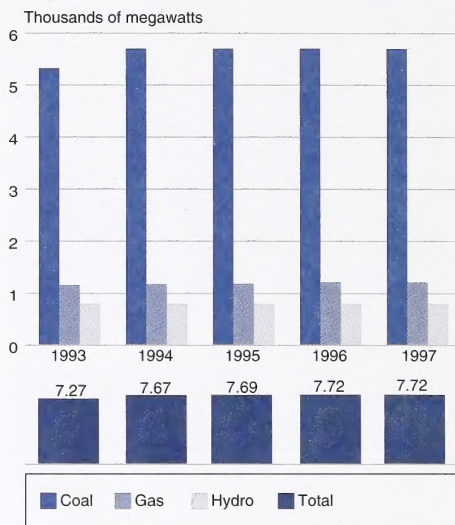


### DELIVERIES OF COAL

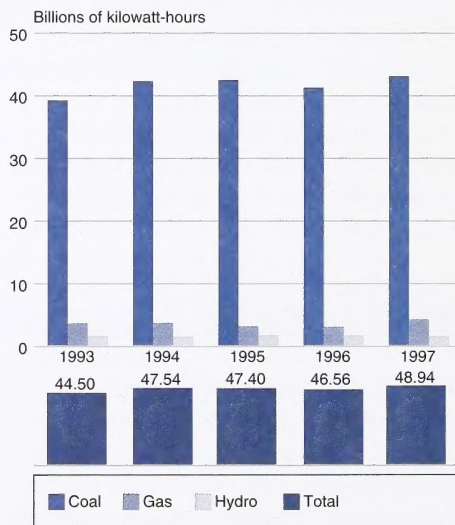


## Electricity

### GENERATING CAPACITY

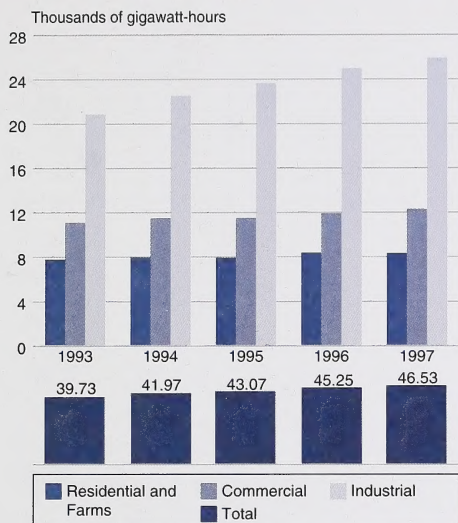


### ELECTRICITY GENERATED





## MARKETS FOR ELECTRICITY



## Electric energy markets grow

In 1997, Alberta's electric generating capacity remained steady at 7.72 thousand megawatts (7.72 in 1996). Generating capacity is always higher than demand to ensure reliability of supply for peak periods of electricity demand. Alberta's electric utilities generated 48.94 thousands gigawatt hours of electricity in 1997, a increase of 5.1 per cent from 1996. Nearly 88 per cent of all the province's electricity was generated by coal-fired power plants, with gas and hydro accounting for 8.6 and 3.4 per cent respectively. Alberta's 1997 electric energy markets continued a recent trend of growth, increasing by 2.8 per cent to 46.5 thousand gigawatt hours. The greatest rise in demand came from the biggest electrical energy user, the industrial sector, which increased consumption by 3.7 per cent. Commercial demand followed closely with an increase of 3.2 per cent, while residential and farm users posted a small decrease of 0.4 per cent.

## Alberta in the Canadian Energy Picture

### ALBERTA'S ENERGY RESOURCES — SUMMARY OF 1997 PRODUCTION AND RESERVES

		Alberta (petajoules)	Per cent of Canada	Total Canada (petajoules)
Remaining Reserves at the end of 1996	Conventional Oil and Pentanes	16 727	59	28 351
	Natural Gas and Natural Gas Liquids	60 339	82	73 584
	Bitumen	286 790	100	286 790
	Coal	689 700	63	1 094 762
	Total	1 053 556	71	1 483 487
1997 Production	Conventional Oil and Pentanes	2 414	58	4 183
	Natural Gas and NGLs	5 801	80	7 295
	Bitumen and Synthetic Crude Oil	1 253	100	1 253
	Coal	944	51	1 845
	Hydro	6	1	1 255
	Total	10 418	66	15 831

In 1997, Alberta accounted for 66 per cent of all the energy produced in Canada. The province produces 58 per cent of the nation's conventional oil and pentanes, 80 per cent of its natural gas and gas liquids, 51 per cent of its coal and 100 per cent of its bitumen and synthetic crude. Alberta contains a similar share of Canada's remaining energy reserves—59 per cent of conventional oil, 82 per cent of natural gas, 63 per cent of coal and 100 per cent of bitumen.



## Our Mission

To ensure that development of Alberta's energy resources takes place in a responsible manner in the public interest and that Albertans receive safe and efficient utility service at rates that are fair and reasonable.

